Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In The Matter Of	
Year 2000 Biennial Regulatory Review	WT Docket No. 01-108
Amendment of Part 22 of the Commission's Rules to Modify or Eliminate Outdated Rules Affecting the Cellular Radiotelephone Service and Other Commercial Mobile Radio Services	

COMMENTS OF QUALCOMM INCORPORATED

QUALCOMM Incorporated ("QUALCOMM"), by its attorneys, hereby submits its comments in response to the Notice of Proposed Rule Making, FCC 01-153, released May 17, 2001 ("NPRM") issued by the Commission in this proceeding.

I. Introduction

Qualcomm is the developer of Code Division Multiple Access ("CDMA"), one of the world's leading wireless communications technologies used by over 90 million subscribers worldwide. A division of Qualcomm, QUALCOMM CDMA Technologies ("QCT"), supplies chipsets ("ASICs") and software for digital cellular telephones complying with the Telecommunications Industry Association (TIA) CDMA standards (TIA/EIA-95) and its successor TIA/EIA/IS-2000. All of the ASICs and software that Qualcomm delivers for the 800 MHz cellular band and a large portion of the ASICs and software that Qualcomm delivers for the 1.9 GHz PCS band support analog cellular operation in accordance with the TIA standard (TIA/EIA-553-A). Qualcomm has been very active is the setting of standards for both digital

(CDMA) and analog cellular telecommunications in the United States. Qualcomm has a deep interest in the NPRM and the Commission's efforts to update and revise the Part 22 rules in light of technological developments.

Qualcomm supports many aspects of the NPRM which propose removing detailed technical requirements from Part 22. Accordingly, Qualcomm supports elimination of the ESN rule (Section 22.919) and the wave polarization rule (Section 22.367(a)(4)) and the corresponding addition of the proposed Section 22.367(d). Qualcomm also agrees with the proposed revision of Section 22.941 so that an industry organization, such as CIBERNET, would assign SIDs, rather than the Commission.

Qualcomm reserves comment on whether digital cellular phones operating in the 800 MHz band should also include analog capability. However, Qualcomm agrees with the proposal in the NPRM to remove the requirement that cellular systems support the AMPS standard in OET 53. Removal of that requirement would be a positive step for the cellular industry. Certain requirements in OET 53 are obsolete and prevent innovation by the industry.

Qualcomm has major concerns with proposed changes to the emission limits for both PCS and cellular. These proposed changes substantially reduce the amount of permissible emissions from PCS and cellular equipment in a way that would not be advisable. In fact, the proposed changes, as set forth in the NPRM, would effectively limit the deployment of 3G technologies (the Spreading Rate 3 ("3x") mode of cdma2000 and WCDMA) in the cellular and PCS bands. Thus, the proposed changes to the emission limits would retard innovation and preclude the deployment of 3G technologies, and thus the proposed changes would disserve the public interest.

Finally, although the Commission does not propose in the NPRM to modify Section 22.913, Qualcomm suggests that the FCC do so to account properly for broadband transmitters. The rule change proposed by Qualcomm would enhance the flexibility of digital wireless systems.

Qualcomm's specific comments on the proposed changes to technical rules in Part 22 are set forth below.

II. QUALCOMM's Specific Comments on the Proposed Rule Changes

A. Electronic Serial Numbers

Qualcomm supports the proposed removal of Section 22.919 from the Commission's rules. The Electronic Serial Number (ESN) is used in addition to the IMSI/MIN for identification of mobile stations. The ESN is currently used as an input to authentication algorithms in current cellular systems. The ESN, in combination with the IMSI/MIN, is used by other fraud detection methods. The ANSI-41 network, used by cellular operators, currently requires that an identification be sent along with the IMSI/MIN. The identification that is used is the ESN. Thus, the network sends the IMSI/MIN and ESN pair. Currently, under Section 22.919, the ESN is required to be factory-set and not alterable, transferable, removable, or otherwise able to be manipulated.

Removal of Section 22.919 would make it simpler to deploy smart cards (so-called User Identity Modules or UIMs) in cellular networks. The HLR and other databases in the ANSI-41 network are designed to accept the IMSI/MIN and ESN pair. However, if the UIM is moved

from one mobile station to another mobile station, the ESN being used by the subscriber changes. As a result, a number of systems, such as fraud detection, which are designed to recognize a specific IMSI/MIN and ESN pair, do not operate properly. The industry has determined that a preferred way is to send the IMSI/MIN and UIM ID. The UIM ID is a number similar to the ESN that resides on the UIM. The UIM ID replaces the ESN in the network and the HLR and other databases are programmed to handle the IMSI/MIN and UIM ID. The UIM ID does not change as the UIM is moved from one mobile station to another.

One of the original reasons for the strict requirements for the ESN was for use in detecting cellular telephone fraud by matching the IMSI/MIN and ESN with a database. By using the UIM ID, however, cellular telephone fraud will still be detected, and users will have the flexibility of being able to use their smart card to access multiple phones. Moreover, a large number of systems are using authentication which is a far superior mechanism to detect fraud. Current generation authentication algorithms use the ESN as input to the authentication algorithm; however, this is unnecessary in the detection of a fraudulent mobile station. Next generation algorithms which have been standardized do not use the ESN as an input to the authentication algorithm. Thus, next generation systems will be able to detect fraud without depending on use of ESNs.

Qualcomm supports maintaining an ESN in the mobile station that can used for identification of the actual mobile station hardware. This can be used to identify the particular mobile station being used by the subscriber. However, the requirements in Section 22.919 that the ESN must be factory-set and not alterable, transferable, removable, or otherwise able to be

manipulated are unduly stringent. Qualcomm believes that the industry can set any needed standards for maintenance of the ESNs and the identifiers that should be used on the air interface and in the network. Qualcomm thus agrees with the FCC that section 22.919 should be deleted.

B. The Wave Polarization Requirement

Qualcomm concurs with the proposal to remove the requirement in Section 22.367(a)(4) that the electromagnetic waves radiated by the base and mobile station must be vertically polarized. A large number of field results have shown that even if the signals are transmitted using vertical polarization, signal scattering and reflections cause a large amount of the power to become horizontally polarized. Today, the majority of cellular telephones are portable units which are usually operated so that power is radiated at an angle of about 45 degrees, thus placing a power into both vertical and horizontal polarizations. With fast power control used in the TIA/EIA-95 digital cellular system, the transmit power is tightly controlled to be the minimum necessary for communications. If the receiver collects more of the radiated power from the transmitter, then the transmit power will decrease; this results in less interference and a corresponding enhancement of the system capacity.

While Section 22.901(d)(2) already affords an implicit exemption for alternate digital technologies such as CDMA, Qualcomm supports explicitly removing this wave polarization requirement and permitting the industry to determine the antenna configurations that maximize performance of cellular systems.

C. Assignment of SIDS

Qualcomm concurs with the FCC that assignment of SIDS can be left to an industry organization, such as CIBERNET. Qualcomm thus supports the proposed revision to Section 22.941.

D. Emission Limits

In paragraphs 39-42 of the NPRM, the Commission proposes to harmonize the wording of the out-of-band emission limit rules for cellular and PCS. However, the proposed sections 22.917 (b) and 24.238 (b) in Appendix A of the NPRM would require a significant reduction in the emission limits for cellular and PCS equipment. This significant reduction, if adopted, would limit the deployment of 3G technologies and thus would retard innovation and deprive the American public of enjoying the plethora of benefits from new 3G technologies.

The current cellular requirement is somewhat vague in the actual measurement bandwidth to be used for out-of-band emissions (outside of 824 to 849 MHz and 869 to 894 MHz), but the FCC and industry have agreed that the measurement bandwidth is 30 kHz. Nevertheless, the proposed requirements indicate a measurement bandwidth of 1 MHz, which is much stricter and is generally applied at frequencies above 1 GHz. Furthermore, the current PCS regulations do not specify the emission limits within the block assigned to a PCS operator, but specify the emission limits for emissions outside of the block assigned to a PCS operator. Standards bodies have translated these out-of-block requirements into a set of emission specifications for equipment taking into account the spectral characteristics of a particular radio technology and the band plan for the particular radio technology.

However, the proposed emission limits in both 22.917 (b) and 24.238 (b) are worded relative to the center of the main emission bandwidth, which is the center of the carrier. For example, the PCS band plan for CDMA has the closest carrier 1.25 MHz from the edge of a block with the main emission rolling off about 600 kHz from the center of the carrier. This gives a region of about 600 kHz within the operator's block to allow the emissions to roll off. The current FCC requirement is for the emissions to be reduced to a level of -13 dBm in a 12.5 kHz bandwidth for the first 1 MHz from the block edge and to -13 dBm in a 1 MHz bandwidth beginning at 2.25 MHz from the center of the carrier frequency. The proposed requirement has moved these requirements to 1 MHz from the carrier center frequency instead of 1 MHz from the block edge. In the case of WCDMA or the Spreading Rate 3 (i.e., "3x") mode of cdma2000, 1 MHz from the center of the frequency is within the main lobe of the emission. Thus, the proposed rule change would effectively limit the deployment of these innovative 3G technologies in either the cellular or PCS bands. Thus Qualcomm recommends that the wording of the PCS emission requirement in 24.238 (b) remain as is.

Qualcomm does recommend that the emission limit for cellular be changed so that the wording relates to the block allocated to the cellular operators (i.e., for frequencies lower than the cellular A band, between the cellular A and B bands, between the B and A bands, between the A and B bands, and above the B band). If the FCC desires to change the existing emission limits, then Qualcomm believes that the new limits be ones that equipment that currently conforms to the currently deployed cellular standards, analog (TIA/EIA-553-A), digital TDMA (UWC-136), and CDMA (TIA/EIA-95 and TIA/EIA/IS-2000) can meet. Qualcomm is willing to work with

the FCC to define emission limits between the allocated blocks in accordance with these standards.

Qualcomm supports the proposed revisions to Sections 22.917 (c) and 24.238 (c), as they apply to boundaries of blocks between cellular (e.g., A and B) and PCS (e.g., B and E) systems. This will permit operators to coordinate their operations, perhaps by co-location of cell sites, and thus space carriers more closely than may otherwise be done. If properly engineered, a closer spacing will result in an enhanced system capacity (e.g., the cellular systems can support more voice calls).

E. Maximum Base Station Transmit Power

While the NPRM does not propose to modify Section 22.913, Qualcomm recommends that the FCC modify this section to properly account for broadband transmitters. As Section 22.913(a) currently reads, the base station is limited to 500 Watts ERP (effective radiated power). This is generally taken to be per carrier. However, with higher bandwidth techniques, such as CDMA, the existing per carrier fixed limit is inappropriate and counterproductive.

In a typical analog cellular reuse pattern of 21, there are approximately two analog carriers per CDMA carrier. In the 1.26 MHz bandwidth, the analog system could radiate two 500 Watt carriers for a total of 1000 Watts. However, the CDMA system could only radiate 500 Watts. As the bandwidth of the CDMA system increases, the effect becomes more pronounced. For example, a WCDMA system with a bandwidth of about 5 MHz would be limited to 500 Watts, but the analog system could have eight 500 Watt carriers for a total of 4000 Watts.

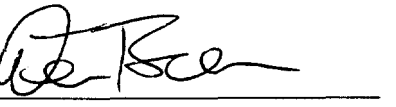
As smart antennas are deployed to support higher capacities, better coverage, and higher data rates, the issue becomes even more problematic. In this case, a base station may have multiple beams being formed. If the limit were applied to mean the total power from all beams radiating a particular carrier, then many of the benefits of such antenna technologies could not be realized.

Qualcomm thus recommends that the Commission modify its rules so that the output power of a base station be specified in terms of a power per bandwidth in a specified angular region.

III. Conclusion

Wherefore, for the foregoing reasons, Qualcomm respectfully requests that the Commission: adopt the proposals in the NPRM to eliminate the ESN, wave polarization, and assignment of SIDs rules and to modify Sections 22.917(c) and 22.238(c); decline to adopt the proposal in the NPRM to modify Sections 22.917 (b) and 22.238 (b); and, modify Section 22.913 as explained above.

Respectfully submitted,

By: 

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